

ABSTRACT

Methods and apparatuses for separating metal values, such as nickel and nickel compounds, from mineral ores, including lateritic ores are disclosed. The method includes providing a mixture of particles (e.g., crushed and sized ore) that is composed of at least a first group of particles and a second group of particles. Group members have similar chemical composition, while particles belonging to different groups have dissimilar chemical compositions. The mixture of particles is exposed to microwave/millimeter wave energy in order to differentially heat the first and second group of particles, thereby increasing differences in magnetic susceptibility between the first and second group of particles. The mixture of particles is then passed through a magnetic field gradient, which causes the particles to separate into magnetic and non-magnetic fractions.

CO004051.DOC